

Armed Forces College of Medicine

AFCM

Muscle Stretch Reflex

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INTENDED LEARNING OBJECTIVES (ILO)

By the end of this lecture the student will be able to:

1) Describe alpha and gamma co-activation
2) List the function of stretch reflex
3) List the properties of stretch reflex
4) List the types of stretch reflex (static MT, dynamic TJ, negative, inverse)
5) List the significance of the muscle tone and illustrate its distribution over the body
6) Compare static and dynamic stretch reflex
7) Describe the inverse stretch reflex and evaluate the role of GTOs

Lecture Plan

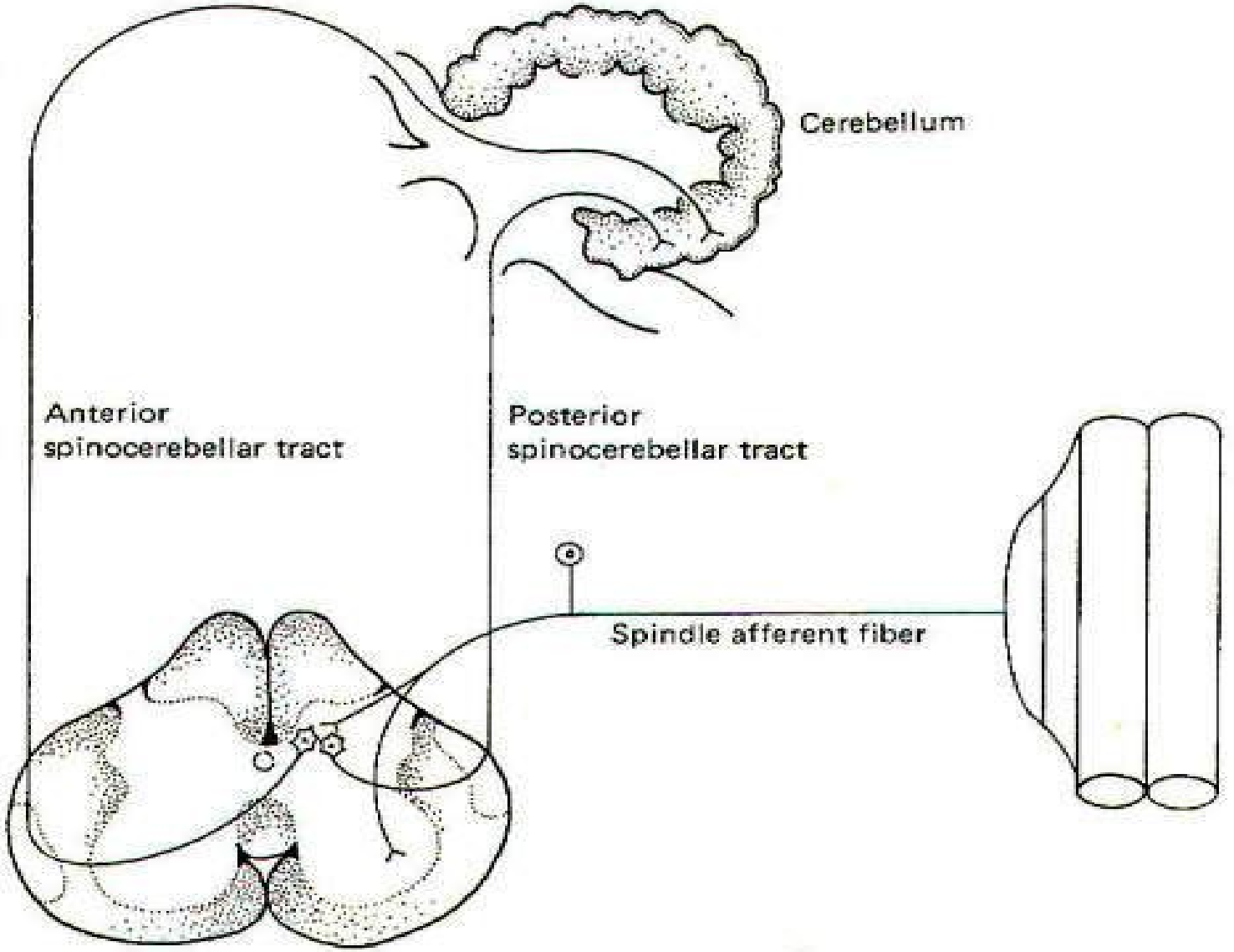
1. Part 1 (5 min) Introduction
2. Part 2 (35 min) Main lecture
3. Part 3 (5 min) Summary
4. Lecture Quiz (5 min)

Types of muscle stretch reflex

	Dynamic stretch reflex	Static stretch reflex
Stimulus	**Sudden stretch**	**Maintained weak stretch**
Receptors	**Nuclear bag**	**Nuclear chain**
Afferent	**Ia**	**II**
Centre & efferent	**α motor neuron**	**α motor neuron**
Effector	**Extrafusal muscle fibers**	**Extrafusal muscle fibers**
response	**Dynamic rapid contraction = Tendon Jerk**	**Weak maintained contraction = Muscle tone**

Cerebellar stretch reflex

- **Long loop**
- **Polysynaptic**
- **Facilitatory**

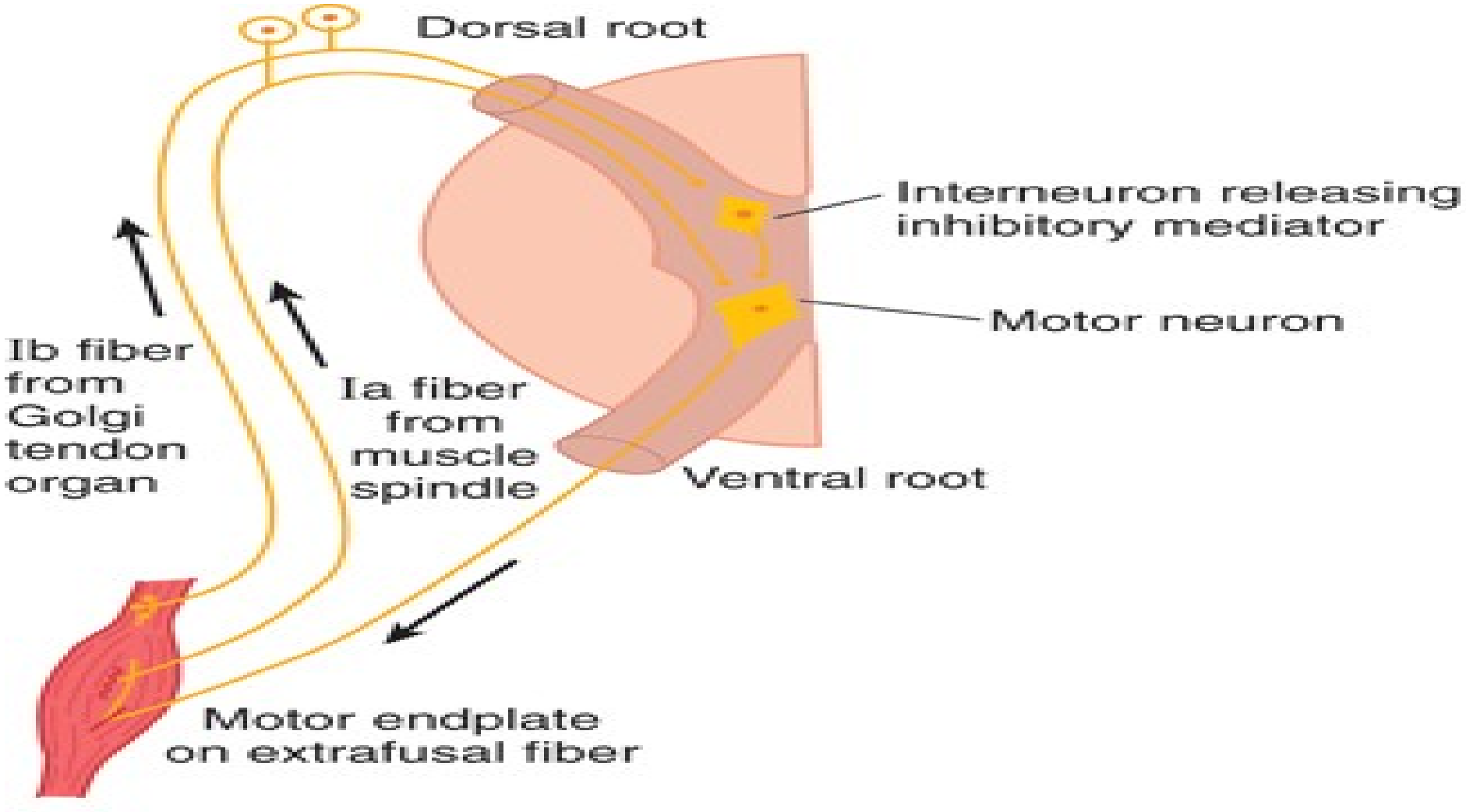


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Functions of stretch reflex

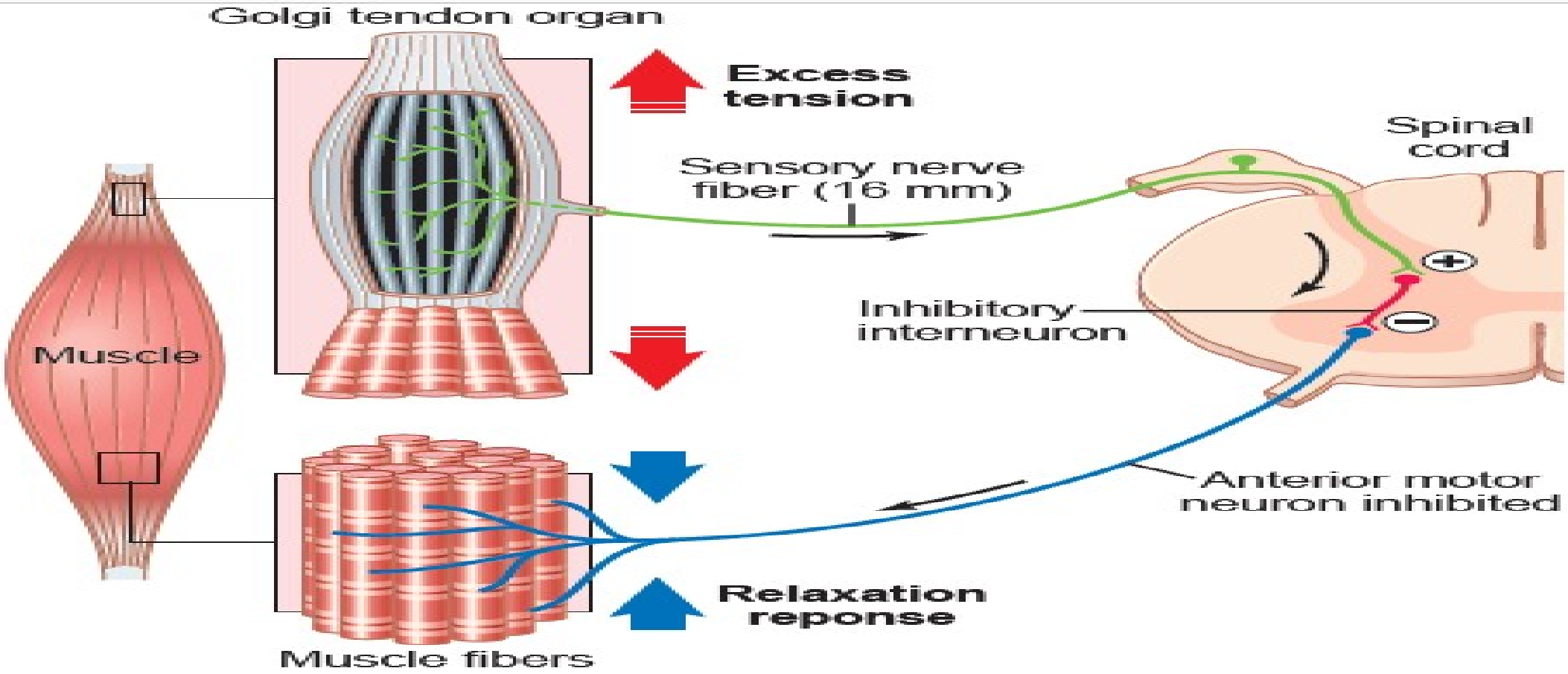
1) skeletal muscle tone
2)Damping action
3)Servo assistant function
α – γ co-activation

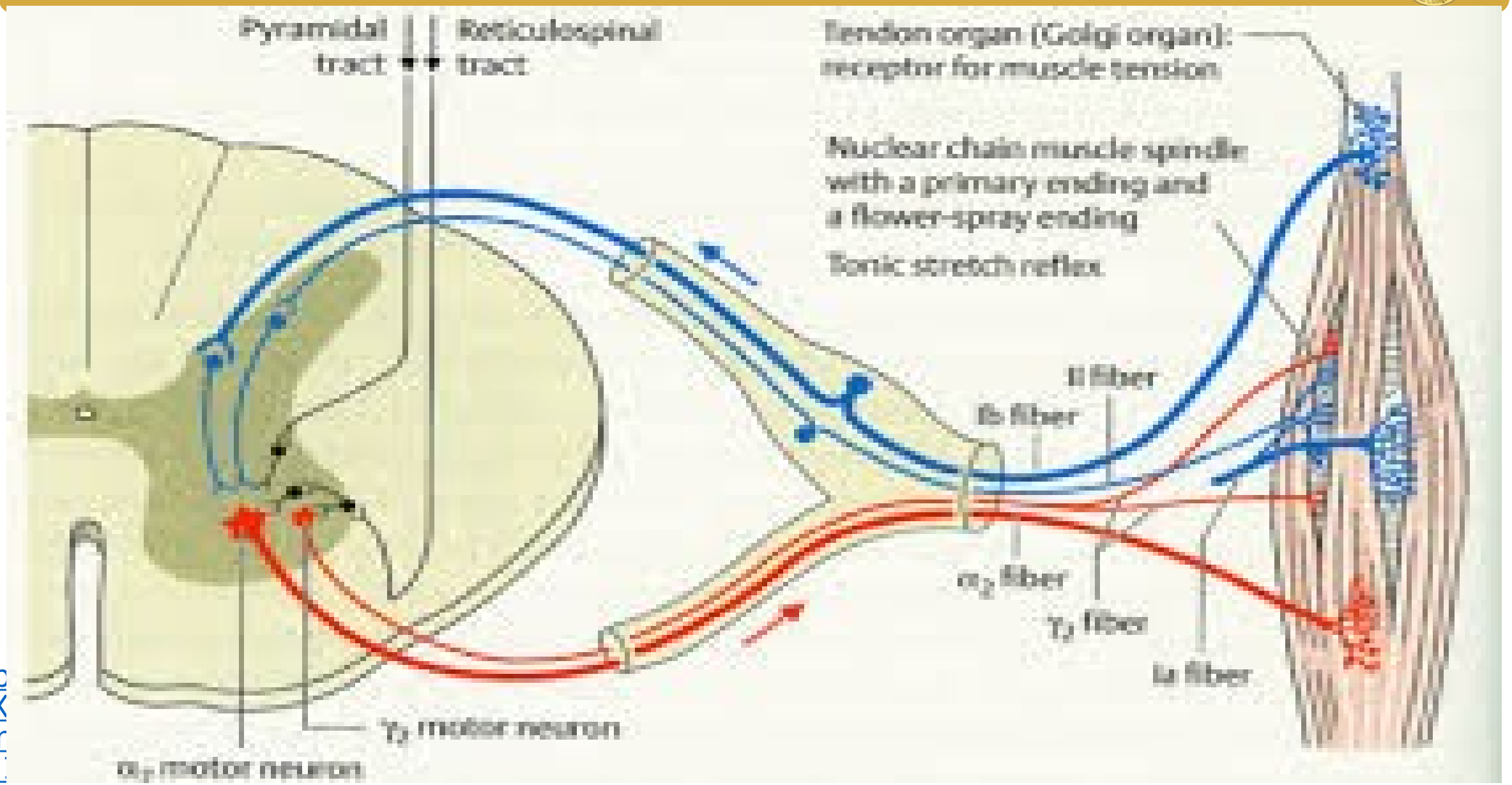
Inverse stretch reflex



Source: Barrett KE, Barman SM, Boitano S, Brooks H: *Ganong's Review of Medical Physiology, 23rd Edition*: http://www.accessmedicine.com

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Applied stretch reflex

1. Tendon Jerk
2. Clonus
3. Clasp knife spaticity

Abnormal muscle tone

- **Spasticity : muscle resist fast passive movement (stretch) of the limb . Unidirectional**

- **Rigidity : resistance of the muscle to stretch in all direction and related to rate of stretch**

Lecture Quiz

When a normally innervated skeletal muscle is overstretched the initial response is muscle contraction; this is called

Stretch reflex
Planter reflex
Withdrawal reflex
Abdominal reflex
Inverse stretch reflex

Illustrate inverse stretch reflex

SUGGESTED TEXTBOOKS

1. Ganong review 25th edition chapter 9 from page 206 to 212
2. Ghyton and Hall 13th edidition from p 695 to 701